WLPCS
Geometry

ANSWER KEY

TOPIC 1: Midpoint and Distance

1. A quadrilateral has vertices P(0,2), Q(2,-1), R(8,3), and S(6,6).

   a. What can you determine about the opposite sides of PQRS? Show work to support your answer.

$PQ = \sqrt{2^2+3^2} = \sqrt{4+9} = \sqrt{13}$

$QR = \sqrt{52} = 2\sqrt{13}$

$RS = \sqrt{13}$

$PS = \sqrt{52} = 2\sqrt{13}$

Opposite sides are = in measure.

   b. What can you determine about the diagonals of PQRS? Show work to support your answer.

$QS = \sqrt{4^2+7^2} = \sqrt{16+49} = \sqrt{65}$

$PR = \sqrt{65}$

Diagonals are = in measure.

   c. What type of quadrilateral is PQRS?

Rectangle

   d. Graph PQRS on a coordinate plane. Find the midpoint of each side length. Connect adjacent midpoints. What figure did you create? How do you know?

Parallelogram!

Opposite sides are parallel (slopes are the same)

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TOPIC 2: Midsegment Theorem

2. Draw a triangle on the coordinate plane and create one of its midsegments.

   a. Verify that the midsegment is parallel to the third side of the triangle (slope).

   slope of $CB = \frac{2}{4} = \boxed{\frac{1}{2}}$

   slope of $\overline{ED} = \boxed{\frac{1}{2}}$ ✓

   b. Verify that the midsegment is half the length of the third side (distance).

   $CB = \sqrt{20}$ OR $2\sqrt{5}$

   $ED = \sqrt{5}$

   $CB = 2(ED)$ OR $ED = \frac{1}{2}(CB)$

   c. Verify that the two triangles are similar.

   SSS

   $\frac{AD}{AB} = \frac{AE}{AC} = \frac{ED}{CB} = \frac{1}{2}$

   SAS

   $\frac{AD}{AB} = \frac{AE}{AC} = \frac{1}{2}$

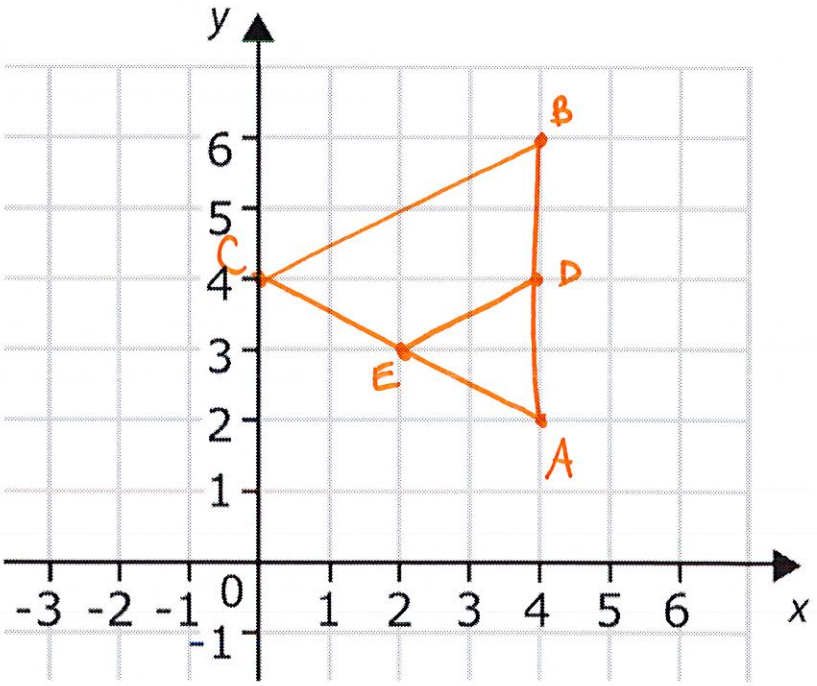
   $\angle A \cong \angle A$ by Reflexive Prop.

   AA

   $\angle BCE \cong \angle DEA$

   $\angle ABC \cong \angle ADE$

   b/c $\overline{DE} \parallel \overline{BC}$ and corresponding angles are congruent



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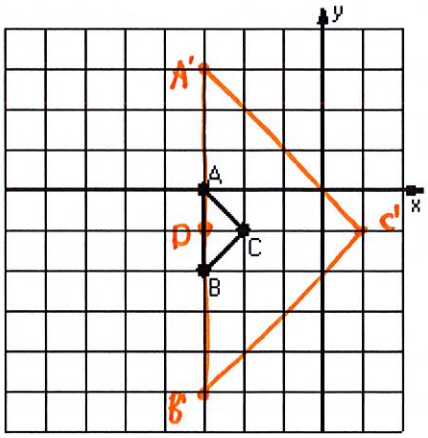
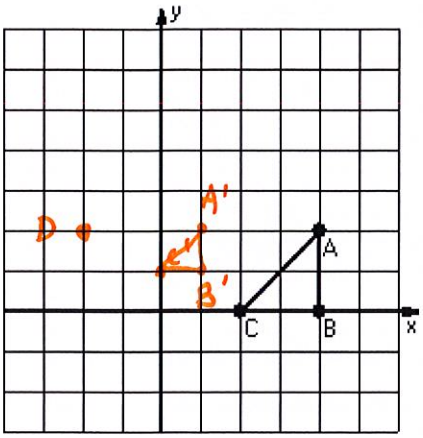
TOPIC 3: Dilations

Directions: Perform the dilation according to the scale factor and center of dilation.

3) Dilation scale = 4, center D(-3,-1)



4) Dilation scale = 1/2, center D(-2,2)



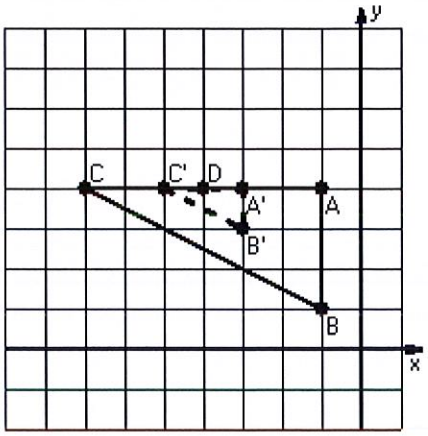
* Choose one problem (#3 or 4) and verify the scale factor by finding the length of two corresponding sides.

$AB = 2$ $\quad \frac{8}{2} = 4$ ✓
$A'B' = 8$

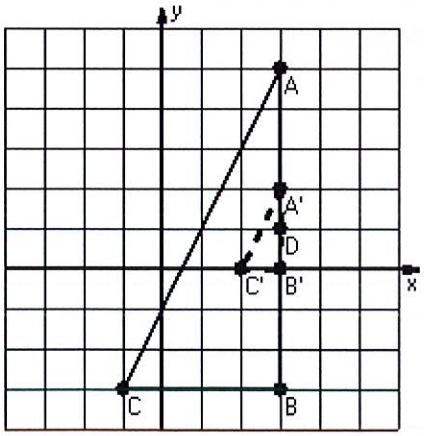
$AB = 2$ $\quad \frac{1}{2}$ ✓
$A'B' = 1$

Directions: Find the center of dilation and scale factor for the given image and pre-image.

5) Dilation scale = 1/3, center D(-4,4)



6) Dilation scale = 1/4, center D(3,1)



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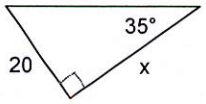
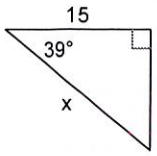
TOPIC 4: Introduction to Trigonometry

Find the missing side. Round to the nearest tenth.

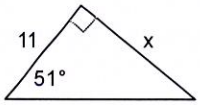
1) 

$\tan 35° = \frac{20}{x}$

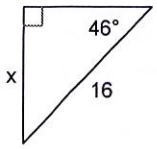
$x = 28.6$

2) 

$x = 19.3$

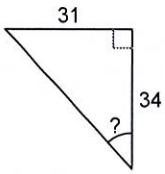
3) 

$x = 13.6$

4) 

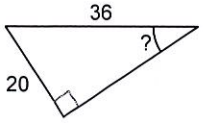
$x = 11.5$

Find the measure of the indicated angle to the nearest degree.

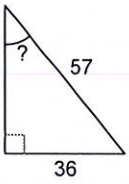
5) 

$\tan ? = \frac{31}{34}$ (use inverse tan... $\tan^{-1}$... to solve)

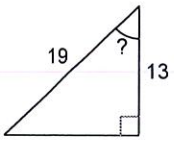
42°

6) 

34°

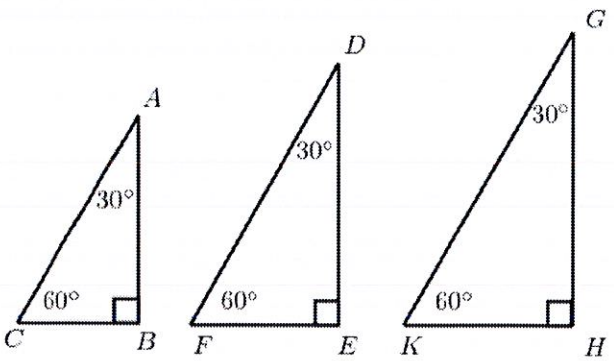
7) 

39°

8) 

47°

9. Are the three triangles below similar? How do you know? Why is the sine, cosine, or tangent of 30° the same for each triangle even though they appear to be different sizes?



- Yes, by AA
- B/c they are similar, their corresponding sides are proportional. $\sin\left(\frac{opp}{hyp}\right)$, $\cos\left(\frac{adj}{hyp}\right)$, $\tan\left(\frac{opp}{adj}\right)$ will be equal ratios for similar triangles.